

The Future of Marine Corps Logistics and the Integrated Logistics Concept: The Practical Implications for the Marine Ground Combat Element

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Subject Area Logistics

EXECUTIVE SUMMARY

Title: The Future of Marine Corps Logistics and the Integrated Logistics Concept: The practical Implications for the Marine Ground Combat Element.

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Thesis: The concept of Marine Corps Integrated Logistic Capability (ILC) Logistic Modernization (LM) as currently planned needs to consider the practical of the Ground Combat Element (GCE) in order to become a fully mature concept.

Discussion: The three principle ILC and LM initiatives concerning the GCE are the Information Technology (IT) Operational Architecture (OA), Realignment Of Supply (ROS) with supply consolidation at the intermediate Combat Service Support Element (CSSE) and the Realignment Of Maintenance (ROM) with collapsing the Echelons Of Maintenance (EOM) from five Echelons to three.

The three initiatives have a history of development since the ILC initiative was first presented in FY 1998/1999. All three ILC initiatives have created various reactions within the GCE, mostly negative up to this point. However, now the logistics community is moving past ILC and is evolving toward a mature logistics concept for the future with Logistics Modernization which still encompasses all three initiatives.

The three initiatives each have areas of concern for the GCE. The principle concern for the OA initiative is the lack of communications infrastructure that will support the key stone of the new logistics system, the Global Combat Service Support-Marine Corps (GCSS-MC) system. The lack of adequate communications systems at the battalion level and below will create serious problems for a system that requires connectivity at all levels to work well. The principle concern for the ROS is the consolidation of the supply functions at the CSSE level with potentially inadequate distribution assets to support units across the future battle space. The principle concern for the ROM is the potential loss of personnel from the GCE and migrated to the CSSE. In addition, the question of which commander, GCE or CSSE, will determine logistics priorities for the GCE is also an area of concern. The concerns for all three initiatives and the potential problems for the GCE were highlighted and emphasized by operational practices during Operation Iraqi Freedom (OIF).

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Conclusions: The communications infrastructure supporting the OA needs to reach down below the battalion level and be able to function over 500+km distances. The ROS should only be implemented when adequate distribution assets are available and the system is tested with multiple GCE units over a 500+ km battle space. The ROM should ensure that maintenance capability remains resident within the GCE units. The GCE commander retains the unity of command within his units and is able to determine logistics and maintenance priority for the GCE elements within the battle space.

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PREFACE

My interest in the Integrated Logistics Concept (ILC) program began in 2002 while assigned to 3d Assault Amphibian Vehicle (AAV) Battalion in Camp Pendleton, Ca. There, I became familiar with the ILC concept and how it was going to potentially impact my community and the ground forces in general. Unfortunately, a pronounced lack of communication by the logistics community as to the reasoning behind the changes being promulgated created much apprehension for myself and my community. In addition, many in the ground community as a whole developed, and retain, a very negative perception of ILC and logistics transformation.

The 1st Marine Division and the ground forces in general, quickly lost focus on ILC as we prepared to deploy for Operation Iraqi Freedom (OIF). During OIF many lessons were learned, and I believe the most valuable of those were in the area of logistics and the challenges of supporting a fast paced GCE dispersed over 500+ km of road space.

Upon returning from OIF, the various ILC initiatives were again a topic of discussion. With the encouragement of various commanders within the AAV community, I decided to investigate ILC with three goals in mind. To ascertain

what ILC really encompassed, what it meant to the GCE, and to use the lessons we had learned from OIF to see if it would work for the GCE. I hope to have accomplished this, and to be of some help to the ground community explaining what ILC and the LM is trying to accomplish and our concerns with the various initiatives.

However, due to the swiftly changing nature of the logistics refinements due to the continuing OIF mission and the changing nature of future requirements, the ILC concept is a target in motion. In fact, its name was changed from ILC to Logistics Modernization (LM) as this paper was written. I have tried to give accurate information, but as needs change I assume the specifics of the LM will be altered with time.

I would like to thank my faculty advisors, Dr. Donald F. Bittner and LtCol Kent S. Ralston, for their support and patience. I would also like to thank the support of the Marines and staff of the S-4 shop at 3d AAV Bn and the members of the AAV community as a whole. Finally, without the patience and support of my new wife, Jamie, I would not have been able to take the deployment to OIF in stride, or to survive the much more problematical proposition of writing this masters paper.

INTRODUCTION

Operations Desert Shield and Desert Strom were great success stories for the United States Marine Corps. They were also valuable learning tools to identify things that needed to be improved. Taking the lessons learned from that conflict, the Marine Corps Logistics Command has been trying to identify needs and to develop a comprehensive plan to transform the Marine Corps Logistics system. The goal is to take a logistics system that has remained essentially static for 50 years and transform it into a agile, responsive and efficient force multiplier using business models from the civilian and 21st century computer and telecommunication technology.

The effort to create a comprehensive plan to transform the business practices of Marine Corps Logistics was first laid down in 1998 and given the working title of Integrated Logistics Capability (ILC). This concept was designed to address four main areas:

- Integration of logistics functions to reduce duplicative maintenance processes within both the Marine Division and the FSSG.
- Transform distribution and Inventory management.
- Use the best practices of the business community to reduce the number of logistics systems.

- Transform the Marine Corps logistics systems into an integrated system of systems.¹

Though this effort was undertaken by the Marine Corps Installation and Logistics (I&L) command in Washington D.C. and briefed extensively to Headquarter Marine Corps (HQMC), the ILC initiative was little known in the operating forces, especially to the Marine ground forces. This lack of understanding and communication between HQMC I&L and the operating forces has lead to confusion and misunderstanding in the ground forces as to what the goals, processes, and end state of ILC were.

The misunderstanding was further exacerbated when a proof of concept was initiated by HQMC I&L at II Marine Expeditionary Force (II MEF). The ILC concept was not briefed to the rest of the Marine Corps in an effective manner and the method, goals and lessons learned from the proof of concept were not well understood by the ground community. As a result, many within the operating forces believed decisions were being made on the future structure, operating processes, manning levels, and new command relationships without the "buy in" of the customer, the Marine ground force commanders. This misunderstanding and confusion continues to this day.

¹ L&L CSSE Advocacy Board Power Point Presentation, *Logistics Modernization*, Dec 2003. Note: Henceforth cited as I&L CSSE Advocacy Board PPT.

Once Operations Enduring Freedom and Iraqi Freedom were under way, the need for new logistics processes, procedures and structure once again became evident. Though none of the new concepts and ideas expressed in ILC were in position to be tested in a combat environment, OIF has provided valuable lessons learned on providing Marine combat forces logistics support in a major theater war over long distances and over extended lines of communication. These lessons are a valuable tool in which to look at the current elements of ILC and see how they will compliment the ground commander's needs.

The purpose of this paper is to *explore the misunderstanding of ILC within the Marine Corps and then to evaluate the overall ability of the ILC concept to successfully support the ground forces.* This MMS will also try to determine specifically if the ILC concept will support the ground forces effectively when utilizing currently planned Information Technologies (IT), supply distribution, maintenance support, and logistical command relationships. Finally, based on current ILC concepts and lessons from OIF, it will identify factors that should be considered so that the future logistics architecture of the Marine Corps will effectively support the Marine ground forces into the future.

BACKGROUND

The Integrated Logistics Concept (ILC) was introduced in 1998 and approved as the new logistics modernization initiative by the Assistant Commandant of the Marine Corps in 1999.² The Marine Corps Installation and Logistics Command (I&L) then began to develop courses of action and implement series of validation exercises that encompassed 2nd Force Service Support Group (2nd FSSG) at Camp Lejeune, North Caroline starting in 2000.³

During this validation phase the 2nd FSSG integrated many functions of logistics. This included three functional areas that were of particular concern to the ground forces. The 2nd FSSG consolidated all maintenance and vehicle recovery personnel and assets into one battalion, 2nd Maintenance Battalion. In addition, the repairable issue point was consolidated at the 2nd Maintenance Battalion.⁴ Though only validated within the FSSG itself, this effort to move all maintainers and supply support functions from using units within the FSSG into one organization caused confusion and concern within the ground

² I&L CSSE Advocacy Board Power PPT

³United States Marine Corps Logistics Enterprise Integration, *Supply Chain Council Awards for Excellence In Supply Chain Operations 2003 Submission*, February 15, 2003, p24. Note: Henceforth cited as USMC Logistics Enterprise Integration.

⁴ USMC Logistics Enterprise Integration, p24.

forces. This concern was heightened when word was received that the 2nd FSSG validation was considered a "success" and would be implemented in a demonstration exercise using 6th Marines starting in 2002.⁵

These efforts to validate the ILC by I&L coupled with poor communication by the logistics community had the unintended consequences of creating a very poor perception of the ILC concept within the ground community. Through poor understanding and rumor of what was happening at 2nd FSSG, some very definite ideas were developed within the ground forces as to what ILC was intended to do. Specifically, that the ILC concept was trying take maintenance capability away from the ground forces.

This unfortunate reality became a nearly universal belief within the ground forces that ILC is essentially an effort to take resources and personnel away from the ground forces and give them to the Combat Service Support Element (CSSE).⁶ The primary belief centered on taking all maintenance, supply and support personnel and equipment from the ground units and hand them all to the CSSE element. This is highlighted by the comments of the Regimental S-4 for 5th Marines, Major Tim Bryant, "Those

⁵ USMC Logistics Enterprise Integration, p22.

⁶ This opinion was widely expressed by commanders and staff during the Summer AAV Operational Advisory Group (OAG) meeting held during August 2002 and attended by the Author.

guys at ILC are trying to take away our ability to support ourselves". This belief was further supported by statements and documents found on the I&L LPV-4 web site and various documents such as the Marine Corps Logistics Transformation Plan for FY-2001 to 2007.⁷

This belief among the operating forces is reinforced by the early plans by ILC to collapse maintenance into three levels vice the current five levels. The documents on the web site dating from 1999 to 2002 support the belief by the ground forces that the intent of ILC is to take away structure from the ground forces through such diagrams as below that plainly show that the intent is to bring all maintenance and support structure into the CSSE element.

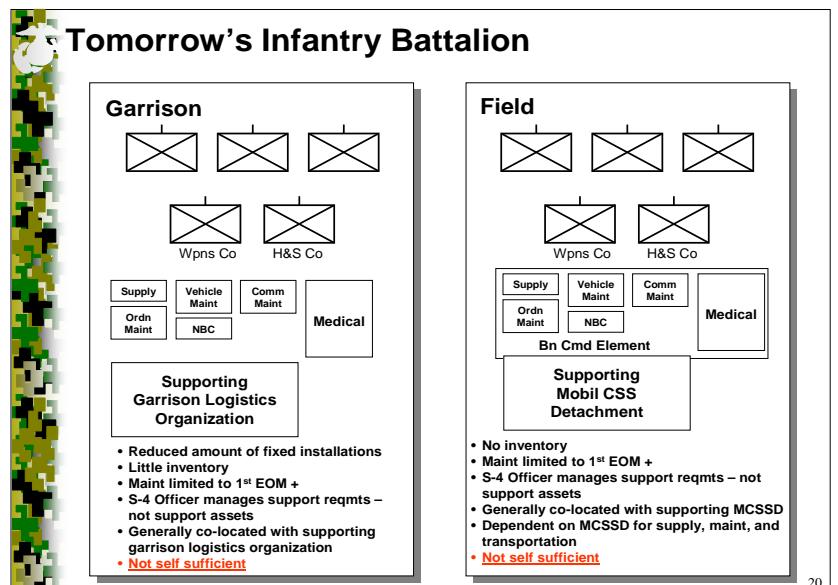


Figure 1

20 8

⁷ The I&L LPV-4 website with past and current ILC documents is at www.hqmc.usmc.mil/LPI.NSF

⁸ Deputy Commandant for Installation and Logistics. Tomorrow's Infantry Battalion. *United States Marine Corps Logistics and Vision and Strategy, October 2001*. Power Point Presentation by HQMC I&L LPV

It is clear from Figure 1 that all support would come from contact teams provided by the CSSE element at some remove from the infantry unit. This would effectively eliminate the GCE commander and his subordinate unit commanders' ability to influence the CSS priorities without first coordinating these needs with the MAGTF commander and his staff. This prospect is disturbing and as a consequence the ground forces are hostile to ILC.

This early effort to migrate all maintenance and supply functions to the CSSE had a negative effect upon the operating forces. This negative impression of the efforts of ILC was further exacerbated by the lack of communication concerning the aims, goals, plans, and timelines of the ILC initiatives by I&L to the commanders in the operating forces as a whole, and the ground forces in particular. There was never any concerted series of briefings or a "get the word out" campaign to inform the "customers" of what was being done for them. In this information void, rumor, misunderstanding, and resentment was allowed to flourish. This has had the general effect of giving the whole ILC concept a negative connotation for many in the Marine ground forces.

OVERVIEW

With an understanding of what the ground forces have come to believe about ILC over the past four or five years, it is important to understand what the ILC initiative currently is. The initiative has grown and been modified to adapt to lessons learned and current operational needs since its initial conception. The initiative is currently divided into five areas.

- Re-engineer logistics Information Technology (IT) and streamline acquisition.
- Move all secondary repairable parts and the 4th Eschelon of Maintenance (EOM) from the FSSG to Logistics Command (LogCom).
- Collapse 2nd and 3rd EOM into one intermediate level on maintenance.
- Move selected supply functions to the new intermediate level.
- Establish USMC academic alliance and establish logistics strategic alliance.⁹

Of these five areas, the ground forces are directly impacted by the first four initiatives and they are of the greatest concern to the Marine ground forces. The LPV office at I&L has a very different view of what ILC does for the operating forces and the advantages that these initiatives will specifically bring the ground forces. In general, I&L views the ILC concept as a way to integrate outdated and duplicative maintenance, distribution and

⁹ I&L CSSE Advocacy Board PPT

inventory management processes.¹⁰ This effort is primarily focused on bringing the best business practices of business, modern logistic information technology and reduction of unnecessary duplicative maintenance efforts.

The use of private enterprise systems architecture and organization is primarily focused on the acquisition of the IT architecture and implementation of the integrated logistics systems. The focus is not only to use better business practices to both develop and purchase a new system, but to completely scrap most of the current stove piped logistics systems and create one integrated, transparent, and joint logistics system.¹¹ The end state for the IT infrastructure is to replace a majority of the 240+ logistics systems resident within the Marine Corps into one system which is also able to integrate any legacy systems seamlessly.¹² This initiative will allow requirements, sources of supply, sources of maintenance to be passed quickly up and down the logistics chain with visibility of all requirement status at all levels.

Though defined as separate initiatives by I&L, the effort to move the 4th EOM to Logistics Command and the

¹⁰ LtCol Erick J Lermo, USMC, Deputy Director, Logistics Modernization, LPV-4, Installations and Logistics, HQMC, interview by author, 18 November 2003. Note: Henceforth cited as Lermo Interview 18 Nov 2003.

¹¹ Lermo Interview 18 Nov 2003..

¹² I&L CSSE Advocacy Board PPT

effort to collapse 2nd and 3rd EOM into one intermediate maintenance level are parts of one integrated effort to re-engineer the Marine Corps maintenance processes. The principle effort is to try and eliminate perceived inefficiencies in the maintenance effort due to duplicated and cumbersome maintenance processes within both the Marine division and FSSG. By collapsing Maintenance into three EOM, there would be a dramatic savings in manpower, tools and support equipment.

This is an ongoing process that is currently trying to define what capabilities and functions will be resident at each new level of maintenance. These defined capabilities will in turn influence where various capabilities will reside within the ground forces and the CSSE elements.¹³ Tied into both of these areas is an ongoing effort to try and define what the command relationships will be between the maintainers, and the ground and CSSE commanders.

The third major set of initiatives which directly affect the ground forces is the effort to realign the supply function and distribution networks. There is a major effort to ascertain key lessons from industry to more efficient delivery of supplies to the battlefield. This effort is closely connected to the new IT systems, but does

¹³ Marine Administrative Message 242125Z NOV 03. *RESULTS OF THE REALIGNMENT OF MAINTENANCE (ROM) WORKING INTEGRATED PROCESS TEAM (WIPT) SESSION V.*

not just involve IT solutions. There are plans to utilize more outsourcing of logistics and delivery systems.¹⁴

The effort to outsource is not just limited to supply support, but is also tied into the maintenance support efforts and would increase civilian contractor maintenance support.¹⁵ This effort to increase the use of civilian contractor support with improved distribution systems and networks is aimed at reducing the forward logistics footprint of the Marine Corps Marine Air Ground Task Force (MAGTF) in support of the Seabasing concept.

In an ironic twist, the one idea which was very disturbing to the ground forces and caused most Marines to discount ILC, maintenance migration from the ground forces to the CSSE establishment, may be losing support within the ILC office. In fact, LtCol Erick J. Lermo, Director of LPV at I&L stated, "ILC is not CSS migration and we do not intend to focus on that aspect of maintenance."¹⁶

Even if consolidating the maintenance men themselves at the FSSG is now losing favor, the effort to consolidate levels of maintenance is still being pursued. As such, the extent to which maintenance capabilities will remain in the ground forces is still being developed. Due to the initial

¹⁴ Deputy Commandant for Installation and Logistics. *Marine Corps Transformation Plan FY-2001 to FY-2007*. p 11-29. Note: Henceforth cited as DCI&L Transformation Plan.

¹⁵ DCL&L Transformation Plan.

¹⁶ Lermo Interview 18 Nov 03.

impression that ILC is trying to take away maintenance capability from the ground forces, who will control the prioritization of maintenance efforts and tasking authority to logistic and maintenance units is still a potential point of contention between ILC and the ground forces.

INFORMATION TECHNOLOGY AND ILC

Of the three initiatives within ILC that directly affect the ground forces, the easiest to understand is the need for new Information Technology. The current IT systems used by the Marine Corps to track maintenance, supply stocks, and delivery of materials is over 30 years old and composed of over 240 logistics systems that are stovepiped and not interoperable.¹⁷ The following diagram illustrates the current state of affairs.

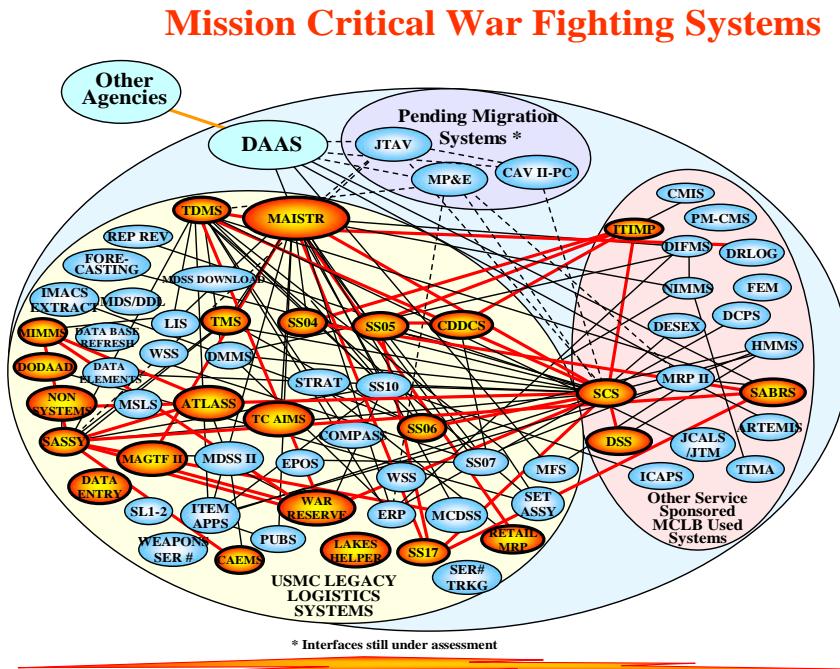


Figure 2

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¹⁷ I&L CSSE Advocacy Board PPT

¹⁸ GS-13 Keith Rineaman, Logistics Specialist, Operational Architecture, LPV-2, Installations and Logistics, HQMC. Interview by author, 3 December 2003. Note: Henceforth cited as Rineaman Interview 3 Dec 03.

These systems are limited and focused by their very nature. As a result, there has been numerous enhancements, interfaces, and add-ons that complicate the picture. The limited nature, age, and ad-hoc upgrades result in requiring large budgets to maintain the various systems from year to year.¹⁹

Though considerable effort is put into the current systems, they unfortunately still don't provide the information needed. Reports are given in limited and obsolete formats. There are also many systems that have redundant capabilities, though they all provide data in different and generally incompatible formats. Essentially, there has never been a coordinated systems design blueprint within the Marine Corps to ensure that systems, data, and technology are coordinated and interoperable.²⁰ The net effect for the supported ground combat units is a very complicated and uncoordinated group of systems that require extensive time and effort at the battalion level to keep updated as depicted below in Figure 3.²¹

¹⁹ I&L CSSE Advocacy Board PPT.

²⁰ I&L CSSE Advocacy Board PPT.

²¹ Rineaman Interview 3 Dec 03.

CURRENT BATTALION LEVEL LOGISTICS INFORMATION FLOW

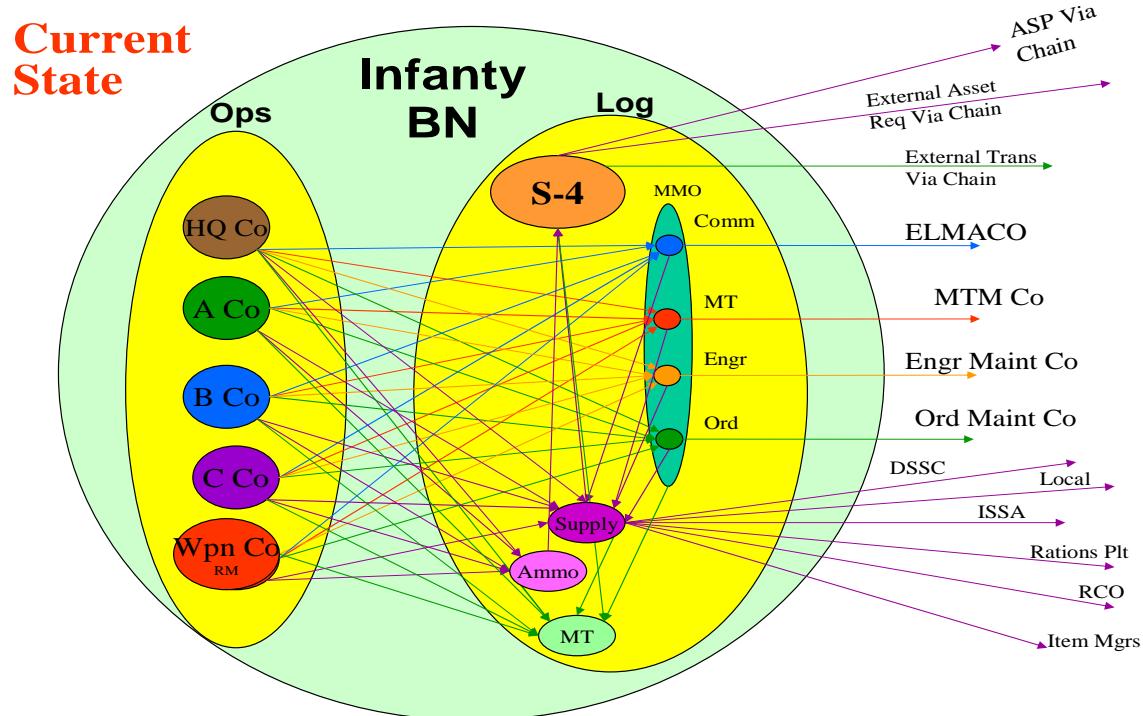


Figure 3

The answer being proposed under ILC is the development of the Global Combat Service Support - Marine Corps (GCSS-MC) System. This system would replace all the other logistics, supply and maintenance support systems under one integrated system that would support expeditionary, joint and combined operations.²² The system is designed to be used at all levels and to be deployable with the MAGTF at anytime or to anyplace.²³

Interoperability, simplicity, and deployability are essential in all operations. It was very obvious during

²² Lermo Interview 18 Nov 03.

²³ I&L CSSE Advocacy Board PPT

Operation Iraqi Freedom (OIF) that the Marine Corps current old and stove piped systems were not able to be deployed easily or successfully. In the words of the Sassy Management Unit (SMU) of the 1st FSSG in their After Action Report (AAR) for OIF concerning the current logistics system, "The ATLASS I architecture used during OIF was complicated, prone to system errors, did not integrate well with ATLASS II Plus and demanded a high level of expertise from Using Unit Supply Officers".²⁴ Clearly, the Marine Corps needs to change.

The current systems, ATLASS I and ATLASS II clearly need to be replaced with a flexible, deployable and interoperable system. The system currently being developed to fill these requirements is the GCSS-MC system.

The GCSS-MC is designed to reduce the number and complexity of the current stove pipe architecture. It combines the functions of all the current multiple systems into one system that reduces the lines of communication and responsibility to manage information into a clear process. The following diagram details those changes compared to the current situation detailed previously.

²⁴ Supply Battalion, 1st Force Service Support Group. After Action Report to 1st FSSG. Subject: *After Action For Operation Iraqi Freedom*. 18 Aug 2003. p18.

FUTURE BATTALION LEVEL LOGISTICS INFORMATION FLOW

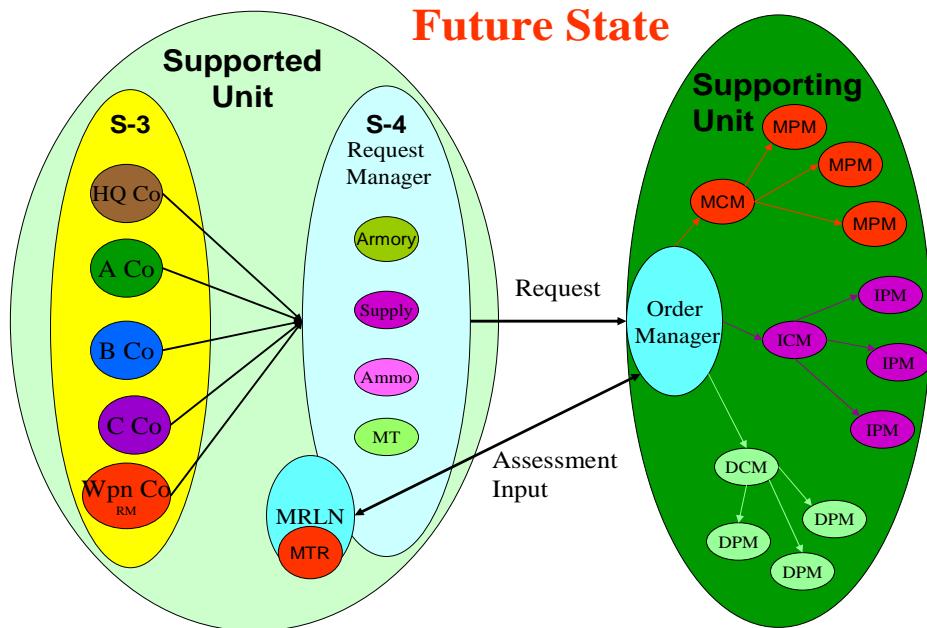


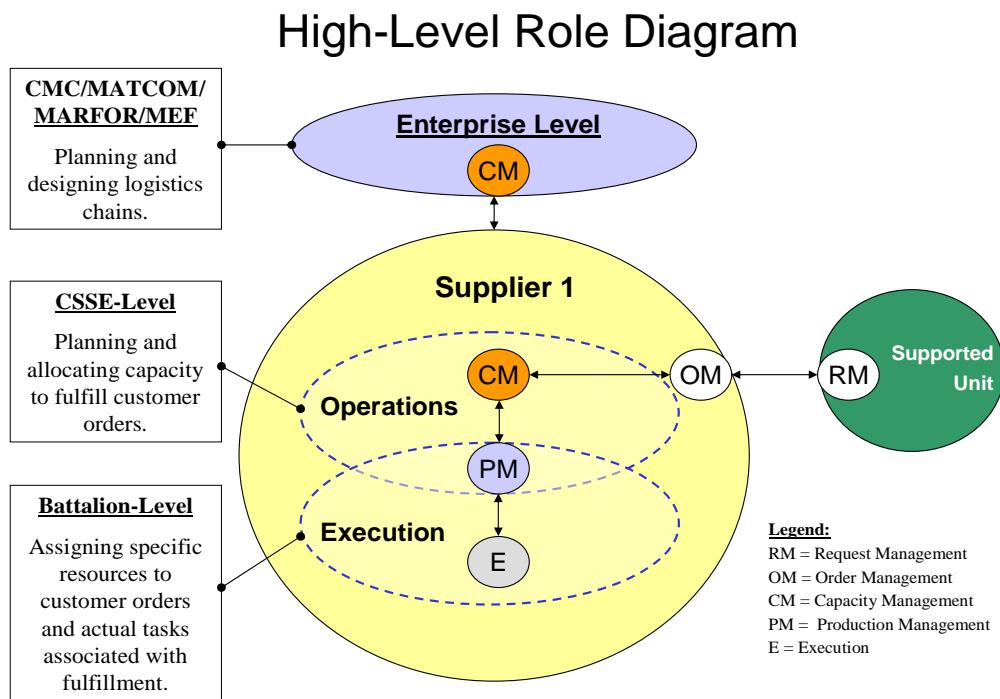
Figure 4

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The system allows ordering to be streamlined. In this concept, the battalion S-4 would become a request manager and would become the single point of contact for the using unit. He would coordinate the needs of the companies and then transmit those requirements via one system (the GCSS-MC) to a single point of contact at the CSS element in support. This single point of contact at the CSS element would be the order manager and he would prioritize and coordinate support for that unit. He would then transmit those requirements to the Direct Support Battalion (DSB) to then provide support to the using unit. The total

²⁵ GS-13 Keith Rineaman, Installation and Logistics, ILP. *Operational Architecture Information*. Email Attachment received on 4 Dec 2003. Note: Henceforth cited as Rineaman Email 4 Dec 03.

architecture is described in this diagram.²⁶



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Figure 5

Closely linked with the IT infrastructure within the ILC is the realignment of the supply support portion of ILC. Just as in the IT infrastructure, the supply support is streamlined to try and reduce redundancy while ordering supplies and support. It also tries to streamline the support given to the using units from the CSSE element.

The following diagram is a description of the logistics chain functions and the duties of each.

²⁶ Rineaman Interview 3 Dec 03.

²⁷ Rineaman Email 4 Dec 2003.

Logistics Chain Functions

- **Request Management (Rapid Request)**: Function of generating and approving supported unit demands.
- **Order Management (Logistics Task Order)**: Function of receiving, coordinating, tasking, and tracking supported unit orders through to fulfillment.
- **Capacity Management (CSS Estimate of Supportability)**: Function of managing, optimizing, prioritizing, and planning resources and capacity to fulfill customer demands.
- **Production Management (Tasking CSS Resources)**: Function of coordinating, planning, tasking, and controlling how customer demands are fulfilled.
- **Execution**: Function of executing CSS tasks to fulfill customer demands.
- **Logistics Chain Planning**: Function of planning the execution of anticipated customer demands and establishing logistics networks.

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Figure 6

The logistics chain functions provide a framework that has not existed up to this point. Previously, the many logistics IT systems had made it impossible to define and describe who is responsible for various function both in garrison and the in the field.

These logistics functions are incorporated into a new logistics chain architecture that is designed to support units in both the field and in garrison. The logistics architecture is illustrated below.

²⁸ Rineaman Email 4 Dec 2003.

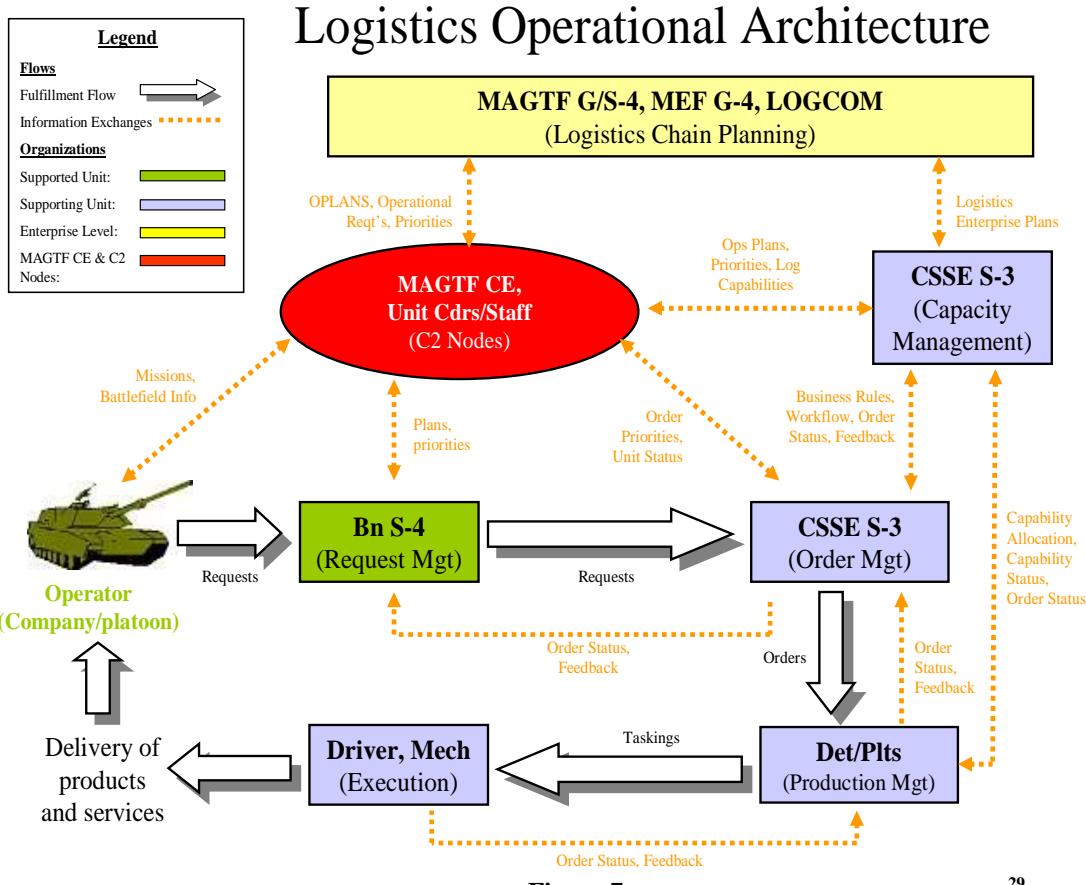


Figure 7

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The intended lines of responsibility are clear and are integrated at all levels to support the ground unit. As a wire diagram, the concept illustrated here provides clear areas of reporting responsibility and shows the communications links of who needs to send information to which recipient. However, even through the communications links seems to be clear, there are various factors that would determine how the request support would reach the end user.

²⁹ Rineaman Email 4 Dec 2003.

NEW ORGANIZATIONAL STRUCTURE

The ILC concept envisions three separate organizational structures for the FSSG to provide support to the ground unit. The first two assume that a Marine Expeditionary Force (MEF) with 50,000 to 80,000 Marines will be supported directly by a Force Service Support Group (FSSG). The first organizational concept is a decentralized process where by requests for support will come from the request manager (RM) in the supported ground unit to an order manager (OM) working within the FSSG G-3 office. The order manager would then task the individual battalions to provide the needed support. An example of the relationships is illustrated in the following diagram.³⁰

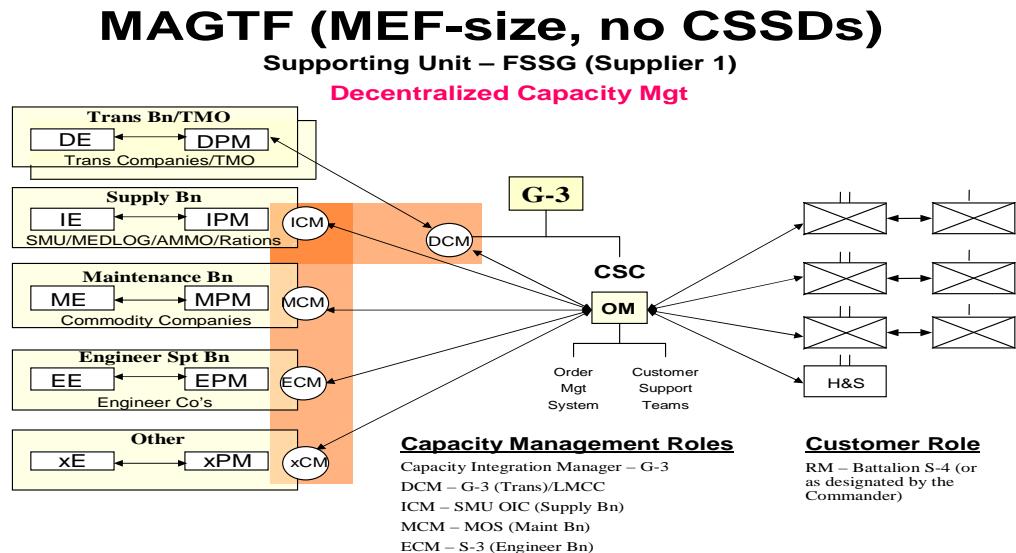


Figure 8

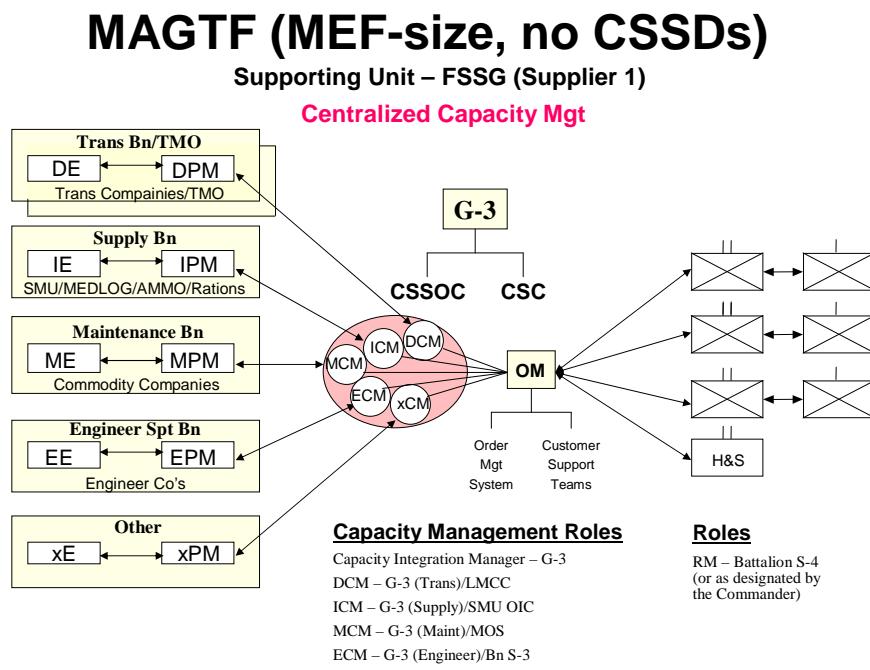
³⁰ Rineaman Email 4 Dec 2003.

This diagram illustrates an approach that is fairly typical of how things were done during OIF with the exception of the IT architecture. The IT architecture allows a single point of contact from the using unit, the RM, to coordinate support with a single point of contact at the FSSG, the OM, who can task the various CSSE battalions to support. Currently, numerous systems and offices within the ground unit would be talking to many points of contact within the FSSG for various types of support. Clearly this streamlining the communications flow would help.

The second organizational option would look very similar, with one exception. The OM would have a staff composed of members from each battalion formed into a Combat Service Support Operations Center (CSSOC). This group would receive requirements from the OM and then work through a collaborative process to determine which battalion within the FSSG should provide support. This collaborative process would allow the CSSOC to leverage the combined assets of all the FSSG battalions towards the requirement passed by the OM.³¹ In essence, they would be able to surge support to an over tasked battalion from within the FSSG.

³¹ Rineaman Interview 3 Dec 03.

This organizational process would closely model the traditional organization within the FSSG. The difference is that the Operational Architecture could conceivably make the cumbersome processes currently used for logistics command and control effective and efficient. This structure is illustrated below.



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Figure 9

The third organizational variation involves breaking down the various battalions within the FSSG into Combat Service Support Detachments (CSSD) of various sizes to provide both direct and general support to the supported ground forces. The use of CSSD in this format is currently how the 1st FSSG supported the ground forces during

³² Rineaman Email 4 Dec 2003.

Operation Iraqi Freedom and which seems to be the preferred form of support by I MEF for the foreseeable future.³³

The ground unit could be provided support in three different ways in this arrangement. First the unit could be supported directly by attaching a Direct Support Battalion (DSB) to a ground unit. As an attachment to the ground unit, the DSB would have portions of all the functional elements of the FSSG within it and would organize and provide support directly. In this case there would direct link to the OM at the FSSG CSSOC for direct support. There would be contact for logistics re-supply, but not for the other functional areas of support.

The second option would have the DSB in direct support of a ground unit. In this case, the DSB would also have functional elements of the FSSG within it, but would be tasked by the CSSOC to focus support to the ground forces. In other words, the DSB would be tasked and supported by the CSSOC where the DSB in the first case would be directed by the supported unit it was attached to.³⁴

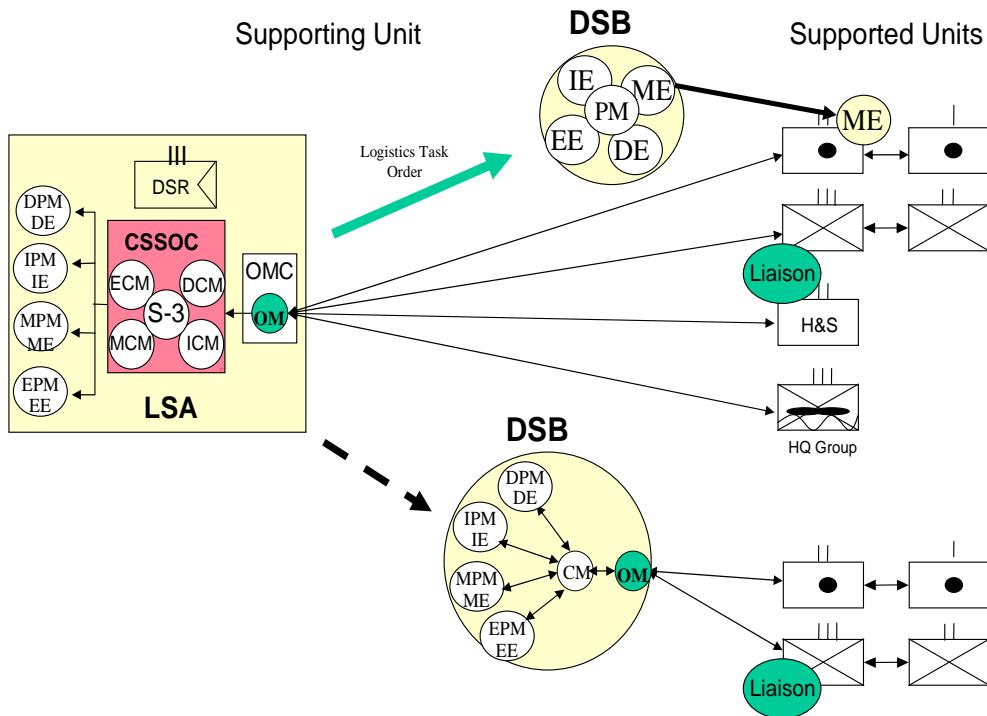
The third option would be to have a ground unit not supported by a DSB, but by the FSSG general support units. These ground units RM would provide requirements to the

³³ 1st Force Service Support Group. *1st FSSG - Expeditionary Operations Organization. August 2003.* Brief in Power Point format.

³⁴ Rineaman Interview 3 Dec 03.

FSSG OM and the CSSOC directly. The CSSOC would then arrange support by either providing the direct support of a DSB, or from general support assets available within the FSSG as a whole. In this way, the FSSG would be able to flex various needs to the supported units from all available sources of support.³⁵ These three options are presented in the following diagram.

MAGTF CSSE with DSBs



36

Figure 10

³⁵ Lermo Interview 18 Nov 03.

³⁶ Rineaman Email 4 Dec 03.

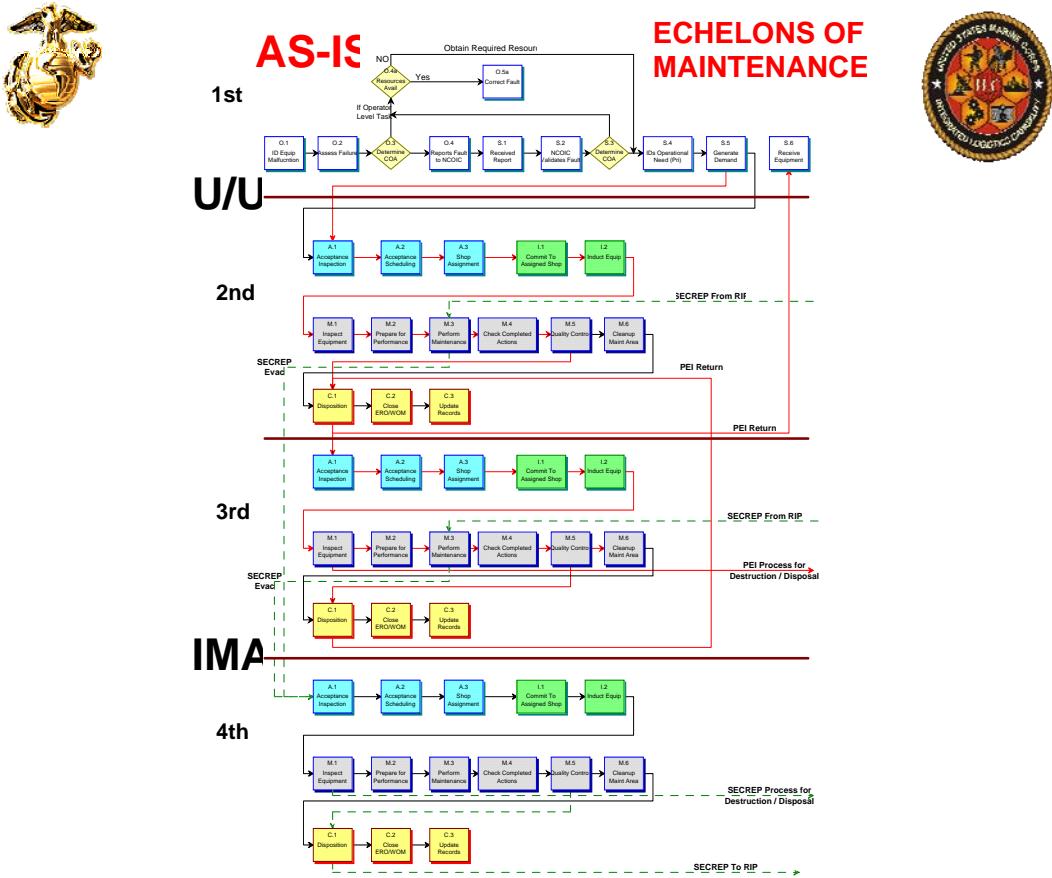
These three overall ways for the FSSG to provide support to the ground forces will work, but there are areas in which recent experience in OIF may highlight various issues associated with these support concepts. These issues will be addressed later in this paper.

REALIGNMENT OF MAINTENANCE IN ILC

The last initiative within ILC that will directly affect the ground forces is the realignment of the maintenance effort. On the surface, the effort to re-align the maintenance echelons from five echelons to three would seem to be easy and non-controversial.

There seems to be no doubt that the maintenance process within the Marine Corps does need to be updated and streamlined. The current state of five echelons of maintenance that has not changed in 30+ plus years has resulted in a complex system that is difficult to define. The responsibility for performing maintenance on one piece of equipment can be difficult to determine and to track. As a result, the complicated flow of maintenance results in slower response as depicted in the following 2001 I&L slide.

CURRENT ESCHEOLNS OF MAINTENANCE



37

Figure 11

The notes associated with this slide describe the current situation this way in 2001.

Note that in the Using Unit there are currently two levels of maintenance. Maintenance actions taught to and performed by the equipment operators are identified as 1st echelon and actions taught to and performed by the maintenance community are 2nd echelon. Now note that when you look at the 3rd echelon within the IMA level, the process and functions are identical to those performed by the maintenance

³⁷ Deputy Commandant for Installation and Logistics. *Echelons Of Maintenance Migration*. URL: <http://www.hqmc.usmc.mil/LPI.NSF> Accessed on 18 October 2003.

person at the U/U (who has, for the most part, the same training, skills and in some cases the same tools). The As-Is process high-lites the fact that a Principle End Item (PEI) identified with a fault, which is required to be corrected at the 3rd echelon level, will have several of the same tasks performed on it at both the U/U and IMA levels. These redundancies add to the length of time an item of equipment stays in the Maintenance Cycle and waste valuable resources that could be applied towards other tasks or missions.

The manner in which the Marine Corps has layered the Echelons Of Maintenance (EOM), at both the U/U and the IMA levels, also has created the need for an additional overhead structure and subsequent cost at each level without regard to efficiency or effectiveness. Additionally this imposes a logistical management burden on the U/U who's primary mission is not logistic support and creates the situation where more than one person in the MAGTF (i.e. CGE and CSSE Commanders) responsible for the process to complete a single repair action.³⁸

This note effectively states the current state of affairs and provides good rational for changing the process as it currently stands. As a result of this identified need, the ILC office came up with a proposal to collapse the levels of maintenance into three levels in order to simplify the overall maintenance effort. The ILC office produced this slide in 2001 to describe the proposed changes.

³⁸ Deputy Commandant for Installation and Logistics. *Echelons Of Maintenance Migration*. URL: <http://www.hqmc.usmc.mil/LPI.NSF> Accessed on 18 October 2003.

FUTURE MAINTEANCE PROCESS

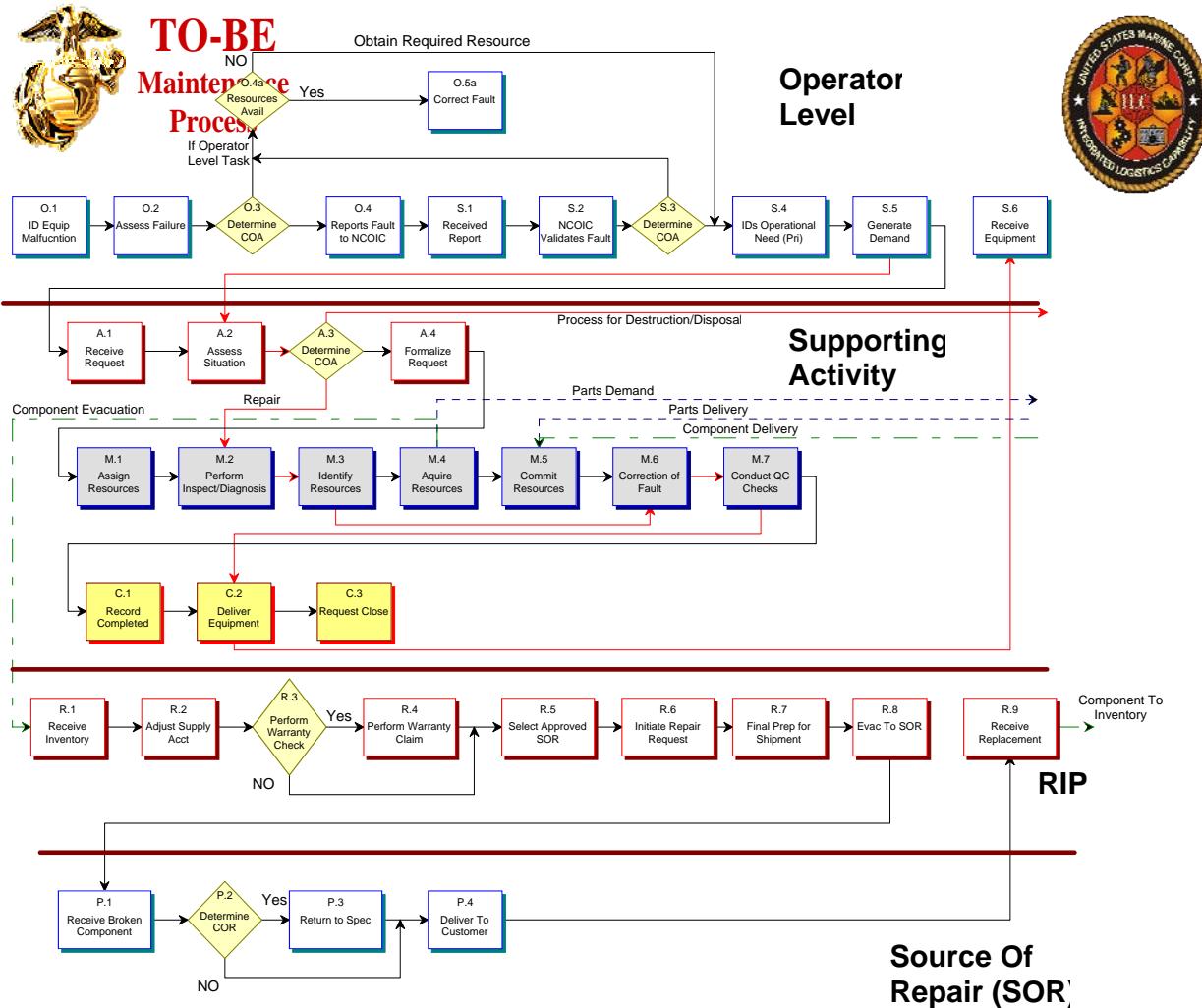


Figure 12

39

The process depicted in the slide would seem to provide several advantages. It clearly defines areas that are the responsibility of the equipment operator, principally preventative maintenance, with all remaining work the responsibility of the maintainers. All maintenance work conducted is consolidated at the

³⁹ Deputy Commandant for Installation and Logistics. *Echelons Of Maintenance Migration*. URL: <http://www.hqmc.usmc.mil/LPL.NSF> Accessed on 18 October 2003.

intermediate level with the elimination of the blurring between 1st and 2nd echelon maintenance. With the moving of the 4th echelon of maintenance to the depot level, it then eliminates the shared processes between the 3rd and 4th echelon of maintenance.

The notes associated with this slide describe the three proposed levels in this way.

The To-Be process model was drafted during the ILC Proof of Concept Workshop on March 26-30, 2001 and then validated during the WIPT May 7-11, workshop onboard Camp Lejeune, NC. The process flows for the RIP and Source of Repair (SOR) were created during the 4th EOM WIPT workshop, held at Albany, GA during May 21-25, 2001.

The significant changes with the To-Be process are the lack of multiple maintenance layers (echelons) within a level of maintenance, and there are no redundant functions/activities within the Maintenance process. The process supports the concept of the CSSE Commander becoming the single process owner for Maintenance in the MAGTF and because the resources necessary to perform the process are under his/her control, there will now be more flexibility to make adjustments to support efficiencies and effectiveness based on mission needs and priorities.

The consolidation of maintenance resources at the IMA level will also reduce overhead resource requirements such as; facilities, tool rooms, layettes, etc...

The three echelons of maintenance make sense; however, there is one area of concern for the ground forces. Within the quotation there is reference to,

The process supports the concept of the CSSE Commander becoming the single process owner for Maintenance in the MAGTF and because the resources necessary to perform the process are under his/her control, there will now be more flexibility to make adjustments to support efficiencies and effectiveness based on mission needs and priorities.⁴⁰

This would imply that all maintenance personnel, as well as decisions on maintenance priorities, would now belong to the CSSE commander.

This impression is also reinforces by the initial proof of concept conducted by 2nd FSSG where all maintenance and recovery assets within the FSSG were consolidated within maintenance battalion.⁴¹ These initial experiments and early briefings made it clear one effort was to divorce the ground units in the GCE from all maintenance capabilities beyond the operator level so "Battalions can concentrate on core competencies."⁴²

This effort has been received very poorly within the ground forces as witnessed from comments made during the AAV Operational Advisory Group (OAG) in the summer of 2002.⁴³ The effort to take away personnel and capability has created animosity and an unwillingness to consider the

⁴⁰ Deputy Commandant for Installation and Logistics. *Echelons Of Maintenance Migration*. URL: <http://www.hqmc.usmc.mil/LPI.NSF> Accessed on 18 October 2003.

⁴¹ Lermo Interview 18 Nov 03

⁴² USMC Logistics Enterprise Integration, p24.

⁴³ This opinion was widely expressed by commanders and staff during the Summer AAV Operational Advisory Group (OAG) meeting held during August 2002 and attended by the Author.

positive aspects of collapsing the echelons of maintenance from five to three.

The I&L office for ILC implementation, LPV-4, has recognized this and has stated that the three echelon of maintenance initiative is being reconsidered and is currently still a work in progress.⁴⁴ The ILC office has recently taken the opportunity to sponsor a number of conferences to establish the definition of each of the three new levels of maintenance. In these conferences the effort seems to be shifting away from migration of CSS personnel and equipment to defining and implementing new processes.

This effort has been taken to define the specific maintenance tasks that will be accomplished at each level and who will undertake those tasks. The Marine Administrative message announcing the proposed definitions describes the current intent as the following:

THESE DEFINITIONS WERE DEVELOPED TO SUPPORT THE "TO BE" VISION OF MAINTENANCE ON THE BATTLEFIELD AND DO NOT IMPLY, NOR ARE THEY RESTRICTED TO, SPECIFIC STRUCTURE, ORGANIZATION OR MANNING OBJECTIVES. RATHER, THEY ARE DESIGNED TO SUPPORT THE OVERALL MODERNIZATION OBJECTIVE OF ROM - INCREASING OPERATIONAL AVAILABILITY BY IMPROVING GROUND MAINTENANCE EFFECTIVENESS.⁴⁵

⁴⁴ Maj Kenneth M. Lasure, USMC. Maintenance Project Lead, LPI, Installations and Logistics, HQMC. Email correspondence with author. 12 January 2004.

⁴⁵ MARADMIN DTG 242125Z NOV 03 / RESULTS OF THE REALIGNMENT OF MAINTENANCE (ROM) WORKING INTEGRATED PROCESS TEAM (WIPT) SESSION V//

In addition, the current effort to redefine the maintenance levels has been designated as part of the next stage in the Marine Corps efforts to transform logistics capabilities initiated by I&L in October 2003. The term ILC has recently been replaced with Logistics Modernization (LM).⁴⁶

This has been done to try and separate transformation of the communications Operational Architecture and the early efforts to reform organization structure through migration of people and equipment to the CSS element. This move to emphasize process reform vice organizational migration to the CSS element has been partially in response to the negative connotation that the term ILC has received in recent years.

This effort to try and reduce the negative perception of collapsing the EOM will help to reduce the fears of the ground forces. However, despite reducing the importance on capability migration, it is still an element of the EOM effort. The LM program is still interested in reducing or removing the maintenance responsibilities from the infantry battalions and regiments. They are focusing especially on common use items such as wheeled assets.⁴⁷ These continuing

⁴⁶ Maj Kenneth M. Lasure, USMC. Maintenance Project Lead, LPI, Installations and Logistics, HQMC. Email correspondence with author. 12 January 2004. Note: Henceforth cited as Lasure Email 12 Jan 04.

⁴⁷ Lasure Email 12 Jan 04.

efforts will continue to make the ground forces leery of the new LM effort and continue to associate it with ILC.

This effort to consolidate the maintenance effort would certainly be more efficient. However, more efficient does not necessarily provide more effective support for the infantry battalion commander. For example, consolidated maintenance migrated to the CSSE element would have presented sever difficulties during combat operations in OIF. The length of the supply lines during OIF resulted in numerous maintenance break downs spread over the 500+ km between Kuwait and Tikrit, Iraq. These breakdowns were usually handled at the battalion or regimental maintenance men resulting in quick and timely repairs.

This ability to quickly identify and fix the vehicles on the spot ensured that the assets were unavailable for the shortest amount of time. In addition, the ability to have maintainers resident and present in the ground units ensured that the assets were either fixed on the move or within a very short time after halting.

Considering the fast paced nature of the attack, distances involved and sever shortage of assets to move the ground forces, the ability to rapidly fix assets on the spot was indispensable to maintaining momentum. It is hard to believe that a consolidated maintenance capability

resident within the CSSE element would have been able to quickly and effectively respond with contact teams to maintenance needs spread over a 500 km battlefield in anything like a timely manner.

ILC LOGISTIC AND MAINTEANCE SUPPORT

The future operational concepts of the Marine Corps to include Ship To Objective Maneuver (STOM) and Sea Basing would seem to indicate that long range movement with little logistics tail would also mitigate against consolidation of maintenance efforts. The Marine Corps logistic support of this vision is encapsulated in the Marine Corps Logistic Vision and Strategy briefing developed in 2001. This vision focuses clearly on providing long distance logistics and maintenance contact teams in a "just in time" manner.⁴⁸ This "just in time" logistics effort relies on GCSS-MC to provide information on needs, but does not address how the logistics or maintainers would arrive to provide the required support. This conceptually depicted in the following slide.

⁴⁸ Deputy Commandant for Installation and Logistics. *United States Marine Corps Logistics and Vision and Strategy, October 2001*. URL:<http://www.hqmc.usmc.mil/LPI.NSF> Accessed on 18 October 2003.

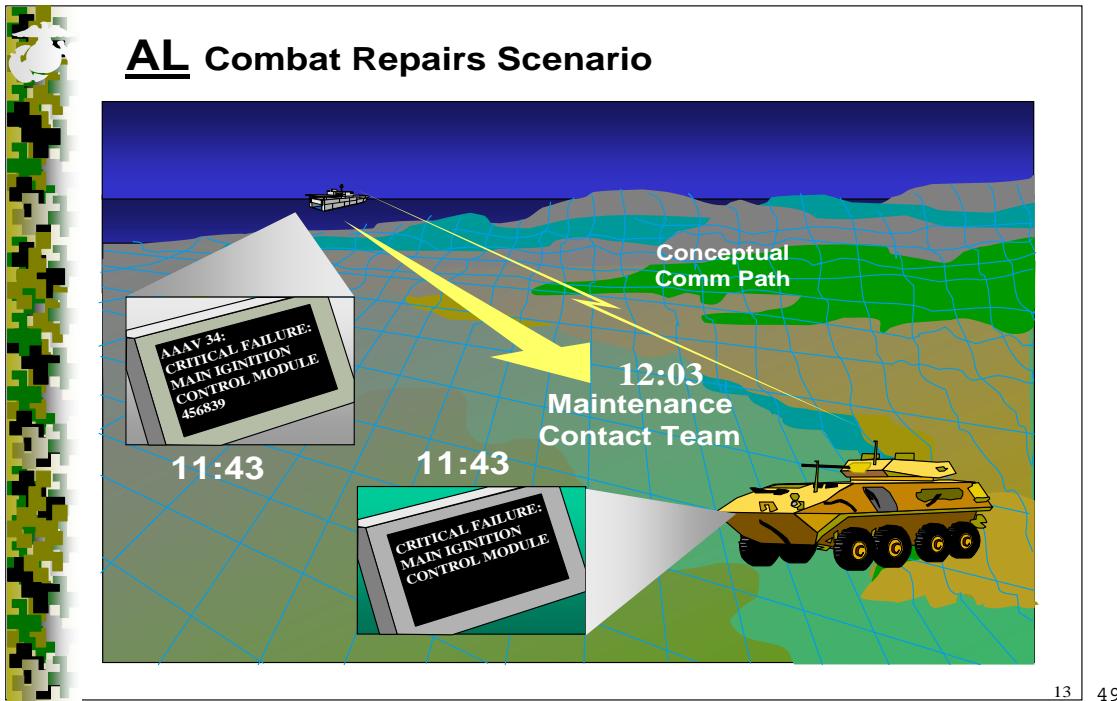


Figure 13

With far flung combat power over a wide ranging battle field, the Marine Corps does not have enough transportation assets to make consolidated maintenance by the CSSE contact teams a viable option in anything as large as a major theater contingency operation. This lack of assets, and no program to address this question or provide the assets, would argue against consolidating maintenance and logistic efforts prior to these assets being available.

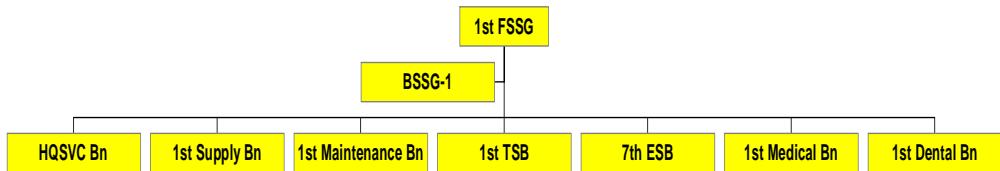
In addition, the number of transportation and logistics support assets needed to provide logistic support over large areas to numerous ground forces in a "just in

⁴⁹ Deputy Commandant for Installation and Logistics. *United States Marine Corps Logistics and Vision and Strategy, October 2001.*

time" manner would be prohibitive. Only when ability to provide quick and seamless support over large areas to numerous users can the maintenance and logistics functions be effectively consolidated within the CSSE element.

This effort to provide effective and timely maintenance and logistic support was recently confronted by 1st FSSG during OIF. The garrison structure of the FSSG was not set up or designed to provide support in a combat environment. The traditional structure of a FSSG in garrison shows a stove piped structure that consolidates functions, but is not effective in providing combat support to numerous organizations spread over large distances.

The Conventional FSSG



Functionally stovepiped; not multifunctional CSS organizations

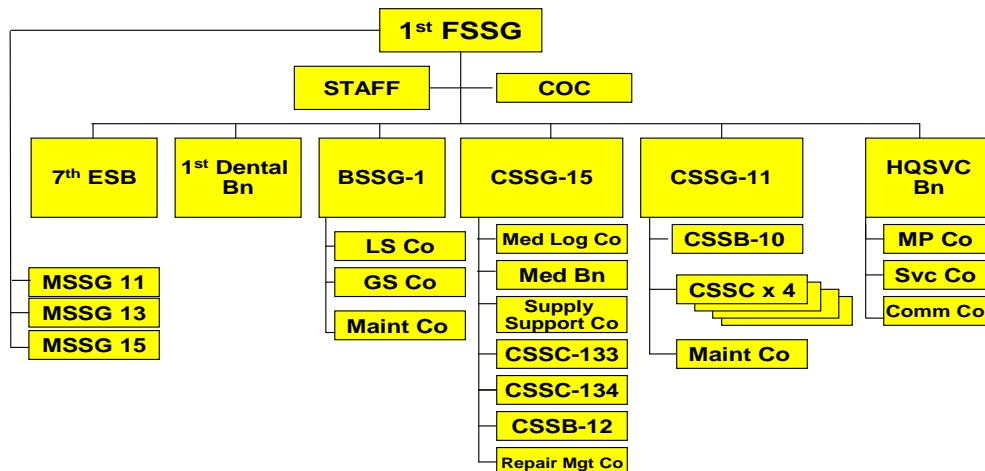
50

Figure 14

⁵⁰ 1st Force Service Support Group. 1st FSSG - *Expeditionary Operations Organization*. August 2003. Brief in Power Point format.

As a result of the need to task organize in order to support the ground forces during IOF, the 1st FSSG was forced to develop a new structure that addressed the need to have elements of each of the traditional battalions in support of numerous units. This structure allowed flexibility and redundancy across the battle space. However, redundancy was not efficient, but it was effective. This trend to effectiveness is in contrast to the increasing emphasis within the LM architecture for more efficient operations. The effort to effectively answer the needs of Marine Corps forces eventually took the form as noted in the following slide.

1st FSSG Expeditionary Template 31 Oct 03



51

Figure 15

⁵¹ 1st Force Service Support Group. *1st FSSG - Expeditionary Operations Organization*. August 2003. Brief in Power Point format.

This task organization allowed the FSSG to effectively respond to the numerous demands during IOF. However, a new structure did not mean that all needs could be answered. Due to the large distances involved and limited long distance transportation assets available, the FSSG and subordinate units were only able to support the ground forces with ammunition, fuel, water and food in that priority.⁵² Even with focusing only on those four supply items, it was a challenge for the FSSG to keep adequate supplies of these four items available to the ground forces.

The difficulty in providing basic support to the ground forces over large distances required a new distribution network to be developed. This network focused on redundancy and moved away from trying to implement the original distribution network. This increasing need for effective and redundant distribution of large volumes of supplies only portends the future of re-supply structures. With more emphasis on long distance re-supply in OMFTS and STOM, OIF was the first time the Marine Corps actually tried to re-supply a large ground unit over long distances. By the end of combat operations the distribution network took the form depicted below.

⁵² 1st Marine Division. After Action Report to I Marine Expeditionary Force. Subject: *1st Marine Division Lessons Learned*. 1 May 2003.

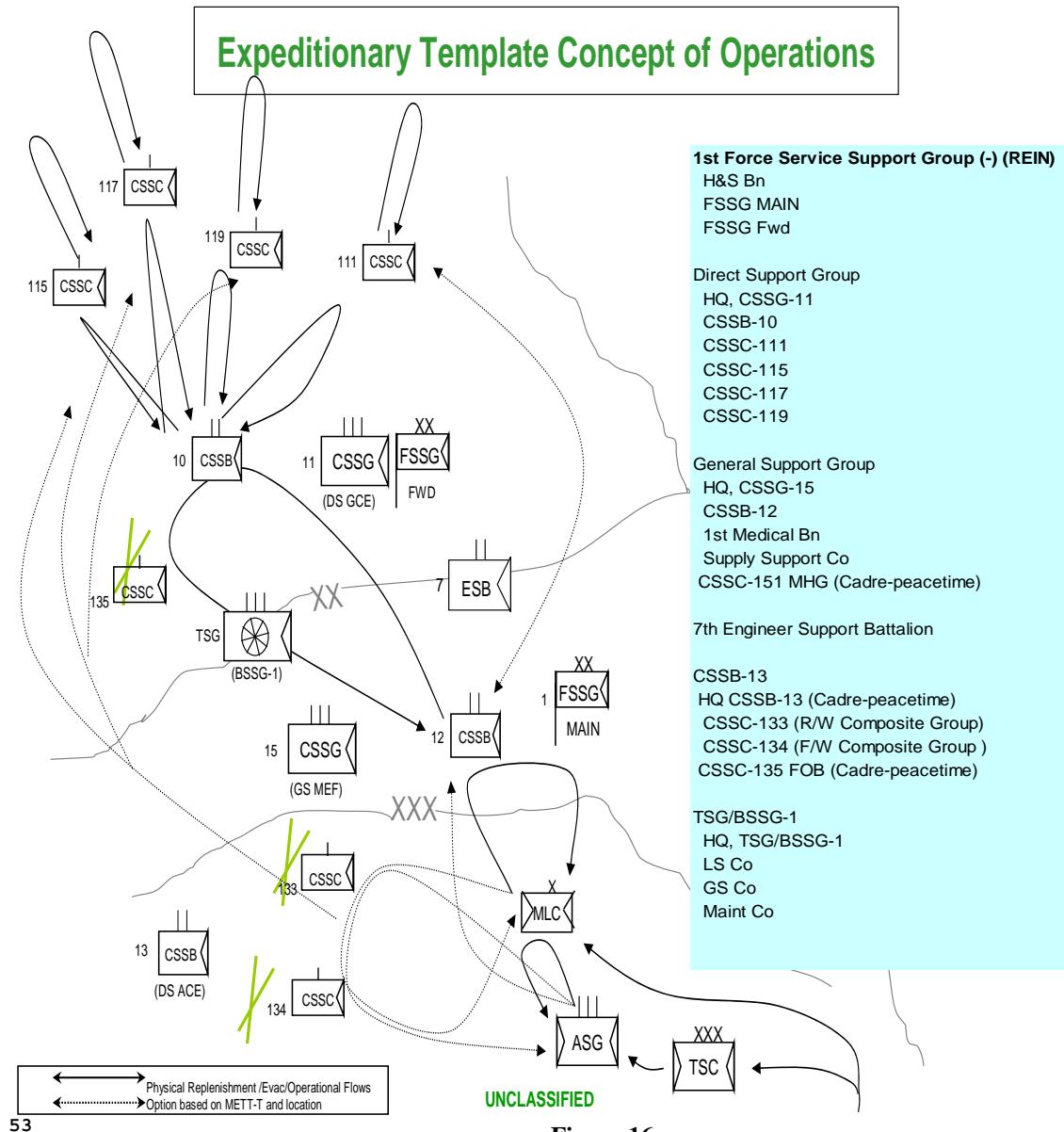


Figure 16

Even with this distribution network in place, there were significant difficulties providing maintenance and parts support. Part of this was difficulties with information technology, but the major challenge involved

⁵³ 1st Force Service Support Group. 1st FSSG - *Expeditionary Operations Organization*. August 2003. Brief in Power Point format.

the large distances involved.⁵⁴ With possible similar future operations included in the concepts of STOM and Sea Basing, it is probable that the Marine Corps would have to support operations over similar distances and large spaces.

How the future logistic vision would address these distance problems is not well thought out. However, the ability for a ground unit to fix its own assets without needing to wait for contact teams from the CSSE element is vital. It is not even clear if the CSSE element would have the resources to provide contact teams in an OIF or STOM scenario. What resources they did have would undoubtedly be stretched too thin to provide adequate re-supply.

Should there be enough resources for the CSSE element to effectively support a ground unit's maintenance needs via contact team, there is a question on who would who would determine the prioritization of the CSSE's maintenance efforts. Currently with the various battalions and regiments possessing their own maintenance personnel, the unit commander can determine who will have a priority of effort based on the situation his unit is confronting at the time.

One priority within the Logistics Modernization program is to have the CSSE element commander become

⁵⁴ Supply Battalion, 1st Force Service Support Group. After Action Report to 1st FSSG. Subject: *After Action For Operation Iraqi Freedom*. 18 Aug 2003.

responsible for determining logistic and maintenance prioritization.⁵⁵ The CSSE commander would receive guidance and overall priorities from the MAGTF commander. The CSSE commander would then determine priorities within and across the MAGTF and focus efforts based on the previous guidance.⁵⁶

The early ILC effort to consolidate maintenance at the CSSE element was designed to make the CSSE commander responsible for prioritization of the logistic effort. This coincided with the effort to consolidate all maintenance assets under the CSSE commander and allowed the CSSE commander to coordinate all aspects of maintenance support. Now that ILC is shifting to LM and is focused on process and not ownership of the maintainers, there are further questions as to who will determine prioritization now that the ground commanders will retain maintenance capabilities.

⁵⁵ Lermo Interview 18 Nov 03.

⁵⁶ Lasure Email 12 Jan 04.

COMMAND AND CONTROL OF LOGISTIC AND MAINTEANCE SUPPORT

The current focus of the LM effort is to consolidate the maintenance of common use items as described before and to have some ground units like the independent armor and engineer battalions retain the maintenance responsibility for their unique equipment. In addition, discussions on structure of the CSSE organization are still ongoing and it is currently envisioned that Combat Service Support Detachments (CSSD) would be in Direct Support (DS) to the various ground units.⁵⁷

This structure would look very much like that currently being used by 1st FSSG in support of OIF. However, it is still envisioned that the CSSE commander would have final responsibility to set logistic and maintenance priorities within the MAGTF. This authority extend to tasking not only the logistic units in DS to the ground units, but also the organic maintenance capability within the Ground Combat Element (GCE) independent battalions.⁵⁸

The question of unity of command in this situation is an important one. If the CSSE commander has the ability to task and prioritize the logistics and maintenance effort,

⁵⁷ Lasure Email 12 Jan 04.

⁵⁸ Lermo Interview 18 Nov 03.

what role will the ground commanders play? Traditionally, the commander determines his own priorities and then tasks his organic maintainers as well as those units in direct support to him. In this case, he would not have that ability.

The essential question is should the division, or GCE commander if less than a division, have any say in his priorities for fixing critical equipment. The current proposal in LM would have the MEF MAGTF commander as the lowest common commander to arbitrate question of priority of maintenance for the ground forces.

There is a good argument to be made that allowing the CSSE commander to control logistics and maintenance efforts would be more effective and efficient. The question is whether the CSSE commander would be able to have adequate real time visibility of ground unit status across the breath and depth of the battlefield to make timely decisions on support. If OIF is any indication of capabilities over the next five to ten years, the answer is no.

Overall, the question of collapsing the echelons of maintenance and the resulting FSSG organizational and command structures need to be assessed. Once the Marine

Corps make a final decision, the ability to fight effectively, not just efficiently, will be at stake.

CONCLUSIONS

Having looked at the three areas of Information Technology, organizational and maintenance initiatives, there are some trends and conclusions that seem to stand out. Specifically, the Information Technology infrastructure challenges need to be addressed prior to fielding. In addition, the lack of distribution assets needs to be rectified and concerns over unity of command are the greatest issues currently facing the Logistic Modernization initiative.

With respect to the IT concerns, the new GCSS-MC system would seem to answer the need of the Marine Corps to consolidate the many stove piped systems into one system used by all units at all levels. The ability for all units at the lowest level to use it to coordinate logistics would be invaluable. However, the communications bandwidth for ground units, especially at the battalion and lower level, is not developed well enough to run the GCSS-MC in a deployed environment. This is especially true over long distances in excess of 20 km of the supporting CSSE.

During OIF no unit below a regiment had access to communications assets greater than VHF radios. In addition, for those units that did have satellite

communications capability, many were moving so fast that they were not able to set up the network before they were moving again. For these units who were using VHF exclusively, they were often out of range of the CSSE elements or environmental conditions prevented effective communications.⁵⁹

The current plans for the GCCS-MC communications infrastructure is trying to create a conductivity pipe using SINCGARS VHF radios for units who do not have satellite communications. The ability to transmit data, at adequate data rates and over extended ranges needs to be tested exhaustively before this plan is implemented.

The lack of line haul distribution assets will create difficulties for the ground forces. The plan to consolidate the majority of the supply functions at the intermediate level with a focus on "just in time logistics" will create significant distribution challenges. During OIF the lack of distribution assets meant that only ammunition, fuel, water and food could be moved. This limited effort was difficult due to the distance.⁶⁰

Should the supply system be consolidated at the intermediate level and be focused on "just in time

⁵⁹ 1st Force Service Support Group. After Action Report to I Marine Expeditionary Force. Subject: *Ist FSSG OIF Lessons Learned*. 30 Oct 2003.

⁶⁰ 1st Force Service Support Group. After Action Report to I Marine Expeditionary Force. Subject: *Ist FSSG OIF Lessons Learned*. 30 Oct 2003.

logistics", this will mean several things to the ground unit. They will have very little to no ability to stock supplies. They will be totally dependent on the CSSE to deliver the goods on time. They will have little ability to go back to the CSSE themselves for supplies should the CSSE be over tasked. They will not have the ability to prioritize logistics efforts to support their individual needs. If the ground units are to lose the ability to support themselves, there needs to be positive and demonstrable ability to deliver all classes of supply reliably over long distances.

In addition, once the migration to the intermediate level is accomplished, the same issues of prioritization and who determines those priorities are similar to those involved in the EOM. The overall concern with unity of command is the greatest issue with the current Logistics Modernization initiative.

There is a need for the ground commanders to be able to determine priorities of effort within their own commands without having to coordinate all aspect of priorities with the MAGTF commander. This is especially important when the MAGTF is a MEF sized unit. The various division and task force commanders need the flexibility to determine priorities in fluid and time compressed environments. As

recent experiences in OIF have shown, redundancy at the lowest levels was the key to success when the centralized supply and maintenance system broke down due to distance and communications break downs.

One solution is to have the ground commander remain responsible for tasking and prioritization of his unit's maintenance and logistics efforts. If there is excess capacity or capability, the CSSE commander would be able to direct that unit's capability to support an unsupported need elsewhere. If the communications infrastructure issues are adequately addressed, then GCSS-MC would then be an enabler in meeting the needs of both the GCE and CSSE commanders.

Only by adequately addressing the concerns with information infrastructure, distribution asset availability and maintenance in a fluid environment over long distances are addressed adequately will the concept work. This can only be done if the information flow between the logistics community and the ground combat community is improved.

Working together to overcome misunderstanding, distrust and achieving the vision of a simpler, functional and effective logistics systems will be indispensable. The future vision of Logistics Modernization must be one of common understanding and common goals. Though a positive,

transparent and inclusive approach, the Marine Corps can achieve the goal of supporting the war fighters into the future.

APPENDIX A

LIST OF ACRONYMS

AAR - After Action Report
AAV - Amphibious Assault Vehicle
ATLASS - Asset Tracking Logistics And Supply System
CSS - Combat Service Support
CSSD - Combat Service Support Detachment
CSSE - Combat Service Support Element
CSSOC - Combat Service Support Operations Center
DCI&L - Deputy Commandant Installation and Logistics
DSB - Direct Support Battalion
EOM - Echelon Of Maintenance
FSSG - Force Service Support Group
GCE - Ground Combat Element
GCSS-MC - Global Combat Service Support - Marine Corps
HQMC - Headquarters Marine Corps
I&L - Installation and Logistics
ILC - Integrated Logistics Concept
IT - Information Technology
LM - Logistics Modernization
MAGTF - Marine Air Ground Task Force
MEF - Marine Expeditionary Force
OMFTS - Operational Maneuver From The Sea
OIF - Operation Iraqi Freedom
OM - Order Manager
PEI - Principle End Item
RM - Request Manager
ROM - Realignment of Maintenance
STOM - Ship To Objective Maneuver
USMC - United States Marine Corps

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Marine Administrative Message 242125Z NOV 03. *RESULTS OF THE REALIGNMENT OF MAINTENANCE (ROM) WORKING INTEGRATED PROCESS TEAM (WIPT) SESSION V.* Copy Retained by Author. This message from I&L LPV details results of the recent working groups on defining the responsibilities associated with the proposed three echelons of maintenance.

Marine Administrative Message 151724Z DEC 03. *LOGISTICS MODERNIZATION UPDATE 1 - ILC CONCLUDED.* Copy Retained by Author. This message from I&L LPV informs the community that ILC as a project was concluded and the initiatives associated with ILC would continue under the Logistics Modernization project. This message also details current status of the main initiatives within the new LM.

Rineaman, Keith GS-13, Installation and Logistics, ILP. *Operational Architecture Information.* E-mail Attachment received on 4 Dec 2003. Copy Retained by Author. Power Point Slides providing current information on ILC/LM Operational Architecture.

Rineaman, Keith, GS-13, Logistics Specialist, Operational Architecture, LPV-2, Installations and Logistics, HQMC. Interview by author, 3 December 2003. Provided a briefing on the current operational architecture for the GCSS-MC system as well as process architecture for the Logistics Modernization as a whole.

Supply Battalion, 1st Force Service Support Group. After Action Report to 1st FSSG. Subject: *After Action For Operation Iraqi Freedom.* 18 Aug 2003. This report provides a detailed description of many of the supply support failures during Operation Iraqi Freedom. This report covers all aspects of supply support to include processes and information technologies. This material covers these issues from Marine Corps Material Command down to the using unit level. Copy retained by Author.

1st Marine Division. After Action Report to I Marine Expeditionary Force. Subject: *1st Marine Division Lessons Learned.* 1 May 2003. 1st Marine Division report outlining all after action comments and includes an extensive section on logistics challenges. Copy retained by Author.

1st Force Service Support Group. After Action Report to I Marine Expeditionary Force. Subject: 1st FSSG OIF Lessons Learned. 30 Oct 2003. 1st Force Service Support Group report outlining extensive challenges in trying to support 1st Marine Division over extended supply lines and covers actions taken to mitigate problems. Copy retained by Author.

1st Force Service Support Group. Lessons Learned. Subject: 1st FSSG Commanders Lessons learned, Commanders Conference. April 2003. These notes were compiled by the 1st FSSG G-3 from FSSG battalion commanders at a commander's conference immediately after active combat operations had ceased. Copy retained by Author.

1st Force Service Support Group. Brief in Power Point format covering unique organization adopted for operations in Iraq and lessons learned. Subj: 1st FSSG - Expeditionary Operations Organization. August 2003. This brief describes organizational changes taken by 1st FSSG in response to the logistical challenges encountered during and after Operation Iraqi freedom. Copy retained by Author.

Secondary Sources:

Burger, Kim. "Iraq Campaign Raises New Logistical Concerns." *Jane's Defense Weekly*, 10 September 2003, p3, The author discusses logistical transformation and some of the challenges experienced during Operation Iraqi Freedom.

Col Swift, Steven and LtCol Chandler, John. "Logistics Transformation: Embedding Support." *Marine Corps Gazette*, August 2003, 20-23. A strong endorsement of current logistics transformation plans and new operational architectures for logistics operations are presented.

Linkowitz, Nicholas, "Future MAGTF Logistics and Support From the Sea (2010+)." *Marine Corps Gazette*, August 2003, 23-29. Mr. Linkowitz discusses the use of sea basing to provide logistic support for operational forces shore using logistics modernization.

LtGen Kelly, Richard. "Excellence in Logistics Supporting Excellence in Warfighting." *Marine Corps Gazette*, August 2003, 14-16. The Deputy Commandant, Installation and

Logistics recently introduced a vision of the future of logistics modernization for both garrison and deployed forces.

Garamone, Jim. "Speed of Iraqi Battle Tested U.S. Logistics Efforts," *American Forces Information Service*, 19 May 2003. Defense Link, under the key words "Marine Logistics." URL: www.defenselink.mil Accessed on 18 October 2003. The author looks at how speed on the modern battlefield causes new and unexpected complications for logistics efforts.